TRI SERVICE SAFETY CONFERENCE 2005

BMW Motorrad

Garmisch-
Partenkirchen
April 2005

Motorcycle Safety

Review of the Progress so far and
Planned Actions for the Future

TRI SERVICE SAFETY CONFERENCE 2005

- **Motorcycle Safety –a Decade of Progress**
- **Research on Motorcycle Accidents (MAIDS)**
- **An Industry Plan for Action**

Training addresses the key element in motorcycle accidents – the human factor

- Nearly all MC manufacturers offer special training courses
- Some offer special Enduro courses (BMW, KTM)
- Some support national associations to develop training schemes

One way to improve MC safety is to avoid accidents by primary safety measures

- **Stability and handling**

- More difficult and sensitive than in the case of a 4-wheel vehicle,
- Stability, handling and road holding optimisations have a major importance for PTWs, e.g.
  - Frame,
  - Suspension,
  - Tyre adhesion for different road surfaces and conditions
- Have been continuously improved by in-house research and involvement in sport

While in 1992 it was only one manufacturer that offered ABS nowadays there are 7

- Introduction and generalisation of disc brakes to all types of PTWs
- Improvement of the braking performance in wet conditions by the introduction of sintered or semi-metallic pad materials
- Development of Advanced Braking Systems including:
  - Combined brakes,
  - Antilock brakes,
  - And various combinations of these systems

SBC SYNCHRO BRAKING CONCEPT

ABS POWERED BRAKING SYSTEM

One of the most common accident causes is that motorcycles are not perceived correctly by the opposing vehicle driver

Lighting

Introduction of halogen lamps, also on smaller vehicles

Development of new symmetrical beam pattern, particularly for small motorcycles (<125cc)

Introduction of LED lamps, which are less sensitive to vibration

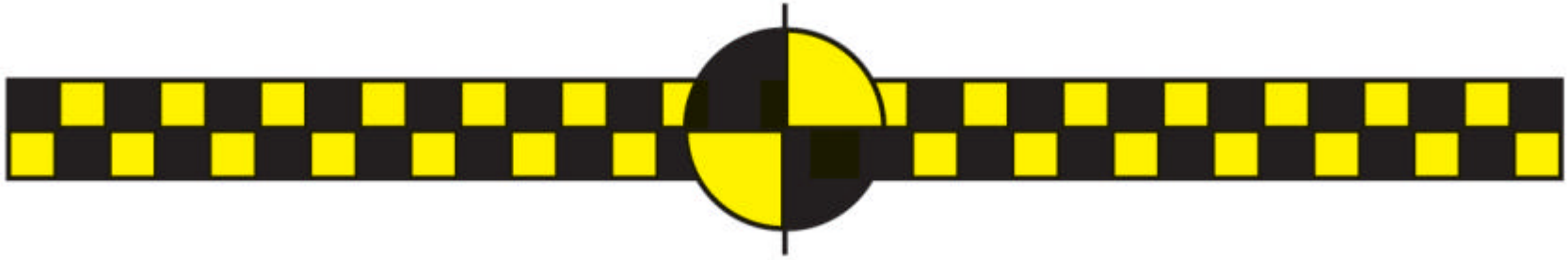
Looking at the possibility of High Intensity Discharge (HID) lamps on motorcycles

The Motorcycle Industry addressed this problem by a voluntary Commitment

Since 2003, Motorcycle manufacturers have introduced Automatic Headlamps ON (AHO), because :

- It improves motorcycle and moped conspicuity, particularly in the countries where AHO is not compulsory
- It addresses rider forgetfulness in the other countries where AHO is already enforced

The room for measures on secondary safety is quite limited for motorcycles



Secondary safety: an extremely difficult subject for motorcycles

- The concept is extremely challenging because:
  - Motorcycles have no bodywork to absorb impact energy
  - The rider is seated on top of, and not attached to the motorcycle
  - Research shows that there is a wide variety of very different accident configurations
- Past work on Leg Protectors and Air Bags has highlighted the need for a specific, internationally harmonised methodology; which is what industry continues to update (ISO 13232)

Nevertheless industry at least developed new concepts to address the issue of safety

- **BMW C1 : a new mobility concept**

- Sophisticated concept integrating comfort, primary and secondary safety devices
- Developed with the use of ISO 13232
- **but** the market did not respond

TRI SERVICE SAFETY CONFERENCE 2005

- Motorcycle Safety –a Decade of Progress
- Research on Motorcycle Accidents (MAIDS)
- An Industry Plan for Action

Detailed knowledge on motorcycle accidents was missing

In 1996 ACEM confirmed that:

Improvements in MC safety are essential for:
riders
the future of motorcycling
the positive contribution that motorcycling brings to society

However, the information available was not enough to develop an integrated safety policy and action plan

Therefore Motorcycle Industry decided to set up a Motorcycle Accident In-Depth Study

Policy makers and other stakeholders need:

- more scientific and systematic information about accidents,
- a robust database, from which the main causes of accidents can be sorted out and prioritized, countermeasures can be identified

Main goal was to improve motorcycle safety

To collect and analyse a comprehensive sample of PTW accidents and controls in Europe, using an internationally recognised common methodology

To identify and analyse the factors influencing accidents, in order to provide a substantial and reliable contribution to the public debate on road safety for PTWs.

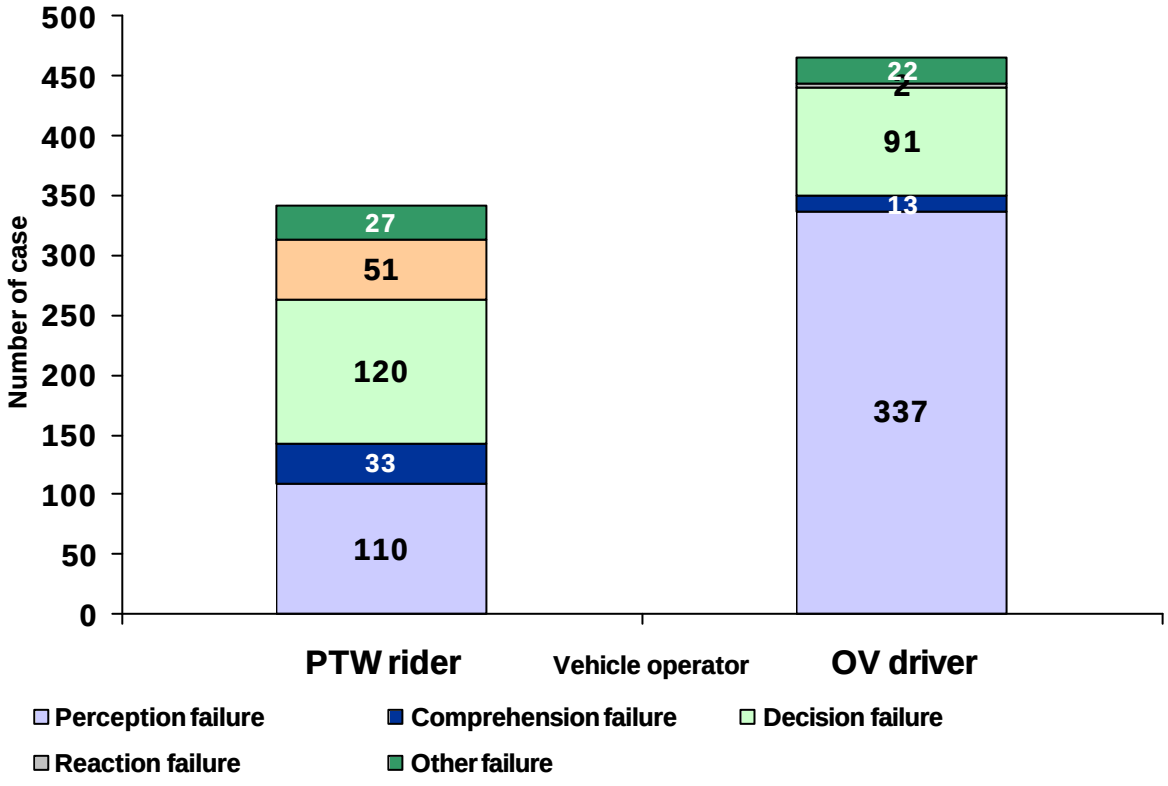
The main findings were not a real surprise but now finally based on scientific research

MAIDS confirmed that:

- Human factors are the primary accident contributing factor in 88% of all cases
- OV drivers are largely responsible for accident causation
  - They represent 50% of all MAIDS cases
  - and 61% of the multi-vehicle accidents

The most common accident cause is that OV driver just not see the PTW

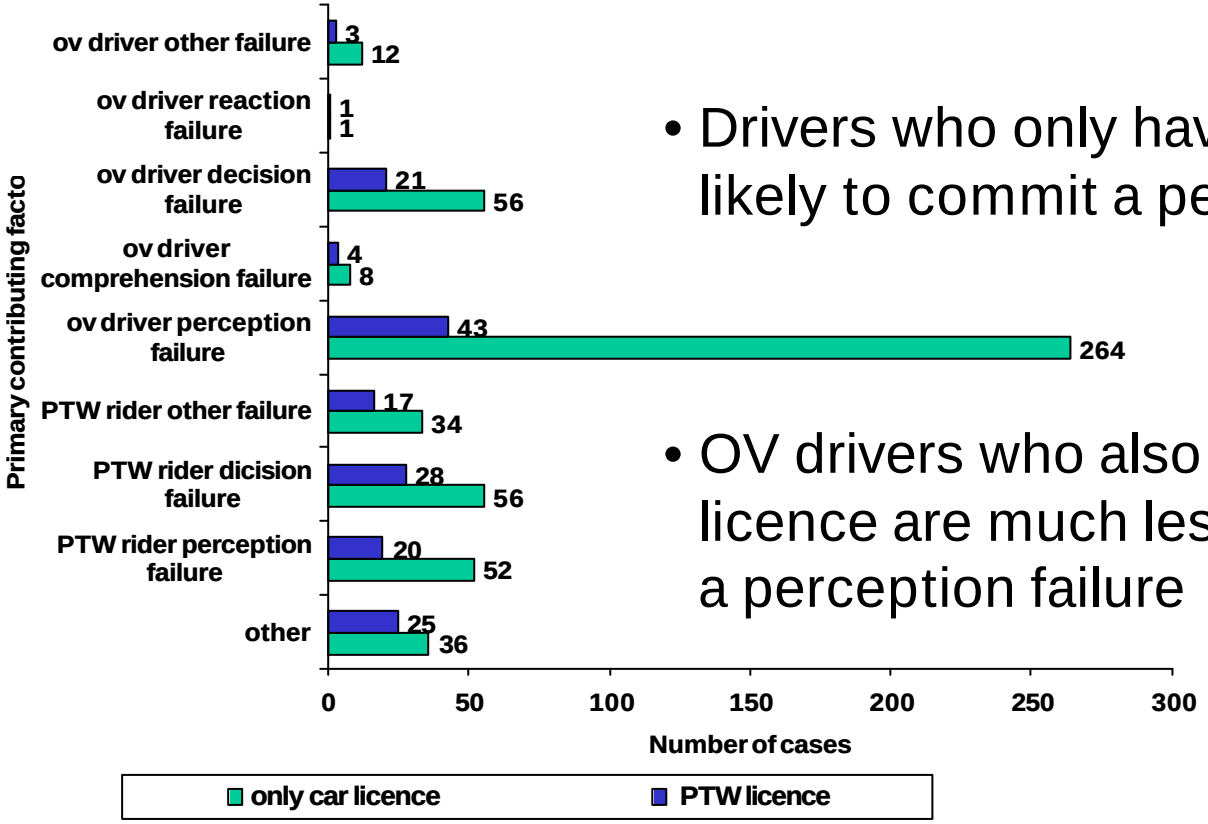
- It represents
  - 37% of all MAIDS cases
  - 72 % of all the OV drivers' failures
- The next most frequent primary accident contributing factor: decision failure from the PTW rider (13% of all the cases)



Reconstruction of an accident

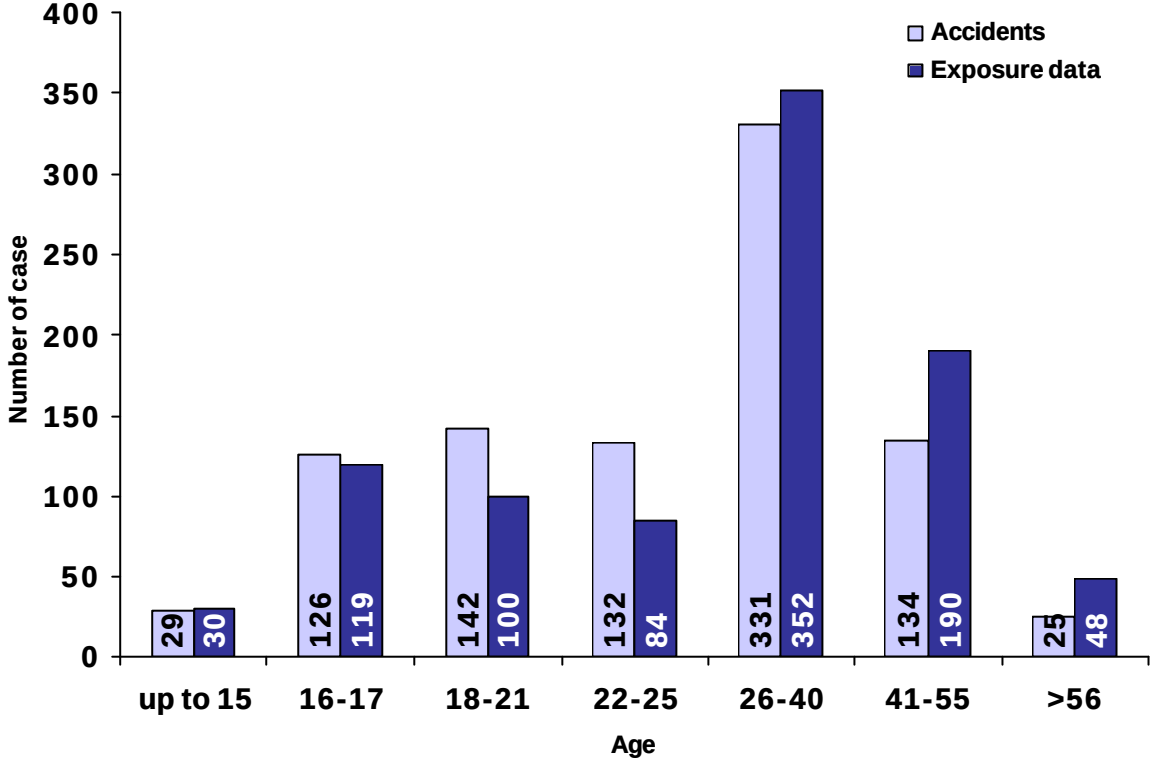
It seems that drivers with only a car licence fail to assess motorcycles correctly

Other Vehicle licence



- Drivers who only have a car licence are likely to commit a perception failure
- OV drivers who also have a PTW licence are much less likely to commit a perception failure

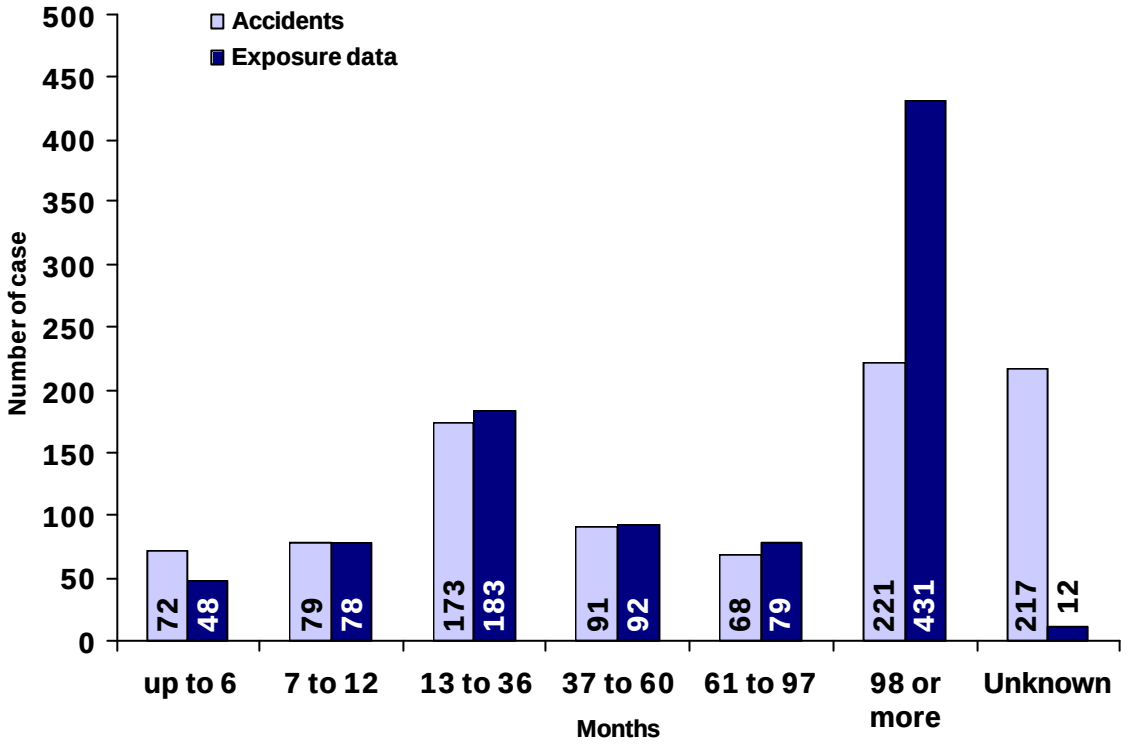
Age is not a significant risk factor



- Young riders under 17 are neither over nor under exposed
- Difference for riders aged from 18 to 25 indicating that this age group is over-represented
- Difference for riders between the ages of 41 and 55 indicating that riders in this age category are under-represented

Experience is a key factor for safe motorcycling

- Riders who have less than 6 months experience on any PTW are more likely to be in an accident when compared to the riding population (8% of accident cases and 5% of exposure cases)



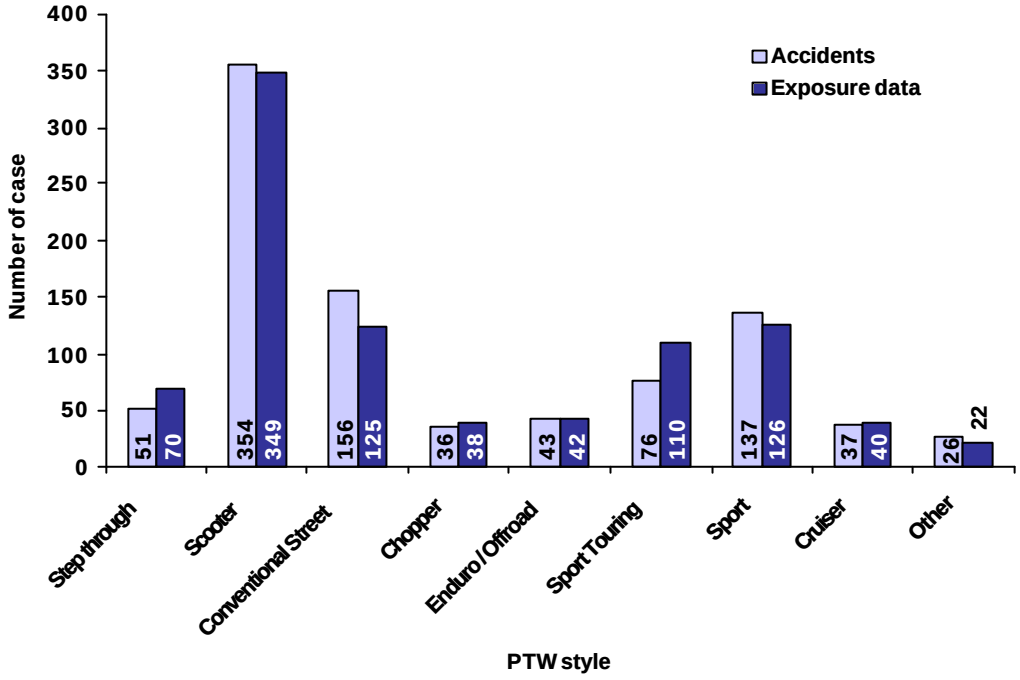
- Riders with a lot of experience on PTWs (i.e. over 98 months) are under represented (24% of accident cases and 47% of exposure cases)

Roadside environmental factors do not play a major role in accident causation

- Roadside environmental factors are the primary contributing factor in nearly 8 % of all cases
- The most significant are
  - Maintenance defect with 2%
  - Design defect in near 1%
  - Temporary obstruction with less than 1%
  - Weather conditions in 2% of the cases

Neither vehicle design nor technical problems are significant accident casusation factors

- ⇨ Scooters were the most frequently reported PTW style with 38%
- ⇨ The next most frequent style was a conventional street PTW with 14%
- ⇨ Statistical analysis revealed no significant difference between the accident data and the exposure data



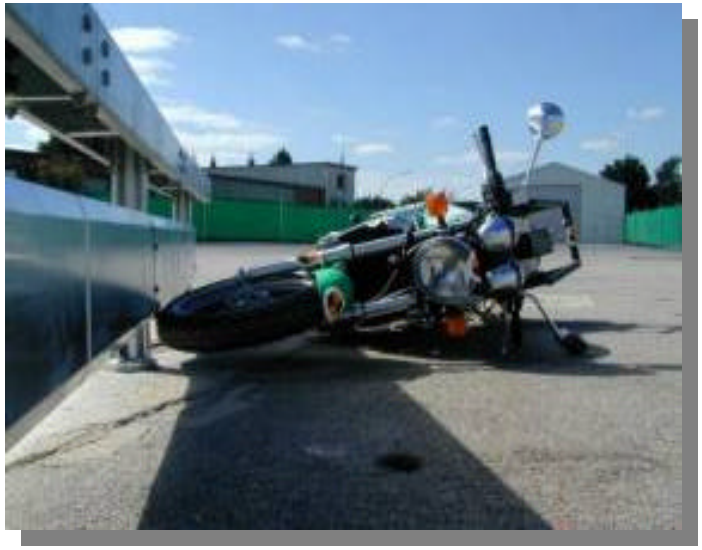
TRI SERVICE SAFETY CONFERENCE 2005

- Motorcycle Safety – a Decade of Progress
- Research on Motorcycle Accidents (MAIDS)
- An Industry Plan for Action

To improve motorcycle safety we have to address the most common accident causes

The main causes of motorcycle accidents are:

- human failure
- bad detection of PTWs
- roadside environment



Initial/Additional training helps to improve the experience and skills of riders

The Motorcycle Industry:

- together with the riders' organisation, is engaged in an EC-funded project on initial rider training

- is committed to develop an **advanced,** voluntary, collision avoidance training scheme

Collision avoidance skills are needed since opposing vehicle drivers often fail to perceive PTWs

In **50 %** of the MAIDS cases **the opposing vehicle driver** was the **first cause** of the accidents

In **70%** of these cases, the **most frequent** cause was a car driver's **perception failure**

The Motorcycle Industry will actively promote

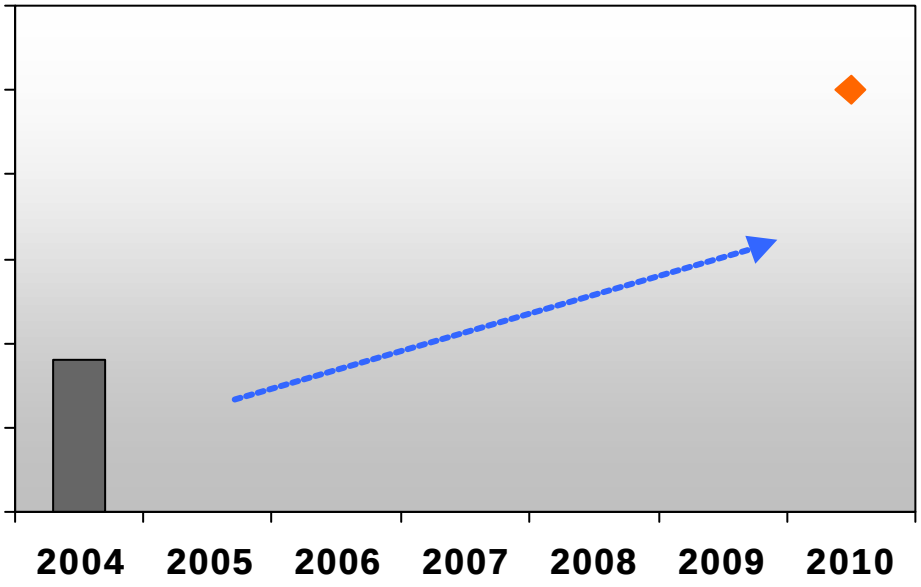
- **PTW awareness campaigns for drivers**
- **Specific training and practical examination schemes**

PTW conspicuity is something that needs to be improved

Using PTW brakes effectively requires a range of skills and experience

Motorcycle manufacturers:

– Are committed to develop simpler-to-use braking systems
– Have signed the European Road Safety Charter
– Will increase the number of vehicles with advanced braking systems



MAIDS clearly shows that wearing a helmet reduces the severity of injuries

MAIDS reported that nearly 8% of riders did not use a helmet (17% for mopeds!)

The Motorcycle Industry offers to support public awareness and education campaigns for:

- better enforcement
- proper fitting and fastening

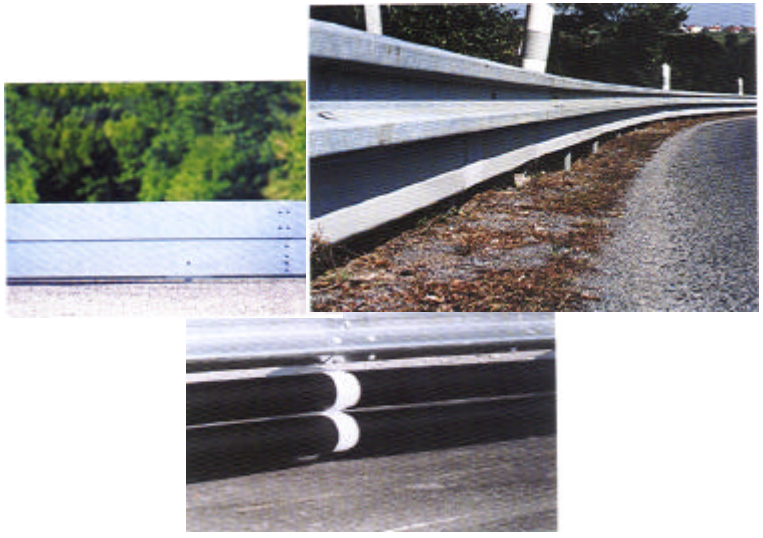
In nearly 10% of the cases, inappropriate road maintenance, furniture etc. caused accidents

Road maintenance defects, visual obstruction, slippery markings, etc. are dangerous for PTW riders

Industry will promote best practice exchanges by initiating a multi-level dialogue with authorities and road engineers

The design of most crash barriers worsen the severity of injuries

Some road furniture causes serious injuries to the rider's head, spine and lower extremities



The Motorcycle Manufacturers

- Will further analyse this type of accident in the MAIDS database
- Propose practical solutions for roadside engineers


Thank you for you attention